Manual Material Handling Guidelines

Industrial Ergonomics

When ergonomics is applied at an industrial work area (e.g., workshops, labs, process areas), it is known as "Industrial Ergonomics." The same ergonomic risk factors are relevant and good work practices should be employed to minimize muscle tension and strain.

Manual Material Handling

Manual material handling involves lifting, lowering, and carrying objects. If ergonomics principles are ignored, stresses on the muscles, joints, and disks in the back can eventually lead to injury. For objects that are too heavy or bulky for safe manual handling by employees, mechanical lifting devices must be used for lifting and moving.

American Conference of Governmental Industrial Hygienists (ACGIH) Lifting Guidelines

Lifting limits should also take into account the location of the load and the frequency of lifting. The following tables indicate situations in which loads should be less than 50 pounds.

Recommended Lifting Limits (in pounds) Tables 17(A), 17(B), and 17(C):

There are three tables, one for Low, Medium, or High-Frequency Lifting, that consider the horizontal (from the spine) and vertical (from the floor) location of the load. Their intersection yields the recommended limit for that type of lift. The three tables represent different frequencies and duration of exposure to lifting during the shift.
To choose a table, determine the duration of the task (<2hrs or >2 hrs/day) and the frequency of lifts per hour.

### Best Practices for Lifting

1. **Assess the situation.**
   - How far will you have to carry the load? Is the path clear?
   - Once the load is lifted, will it block your view?
   - Can the load be broken down into smaller parts?
   - Should you wear gloves to get a better grip?

2. **Size up the load.**
   - Test the weight by lifting or sliding one corner. If it is too heavy or awkward, STOP!
   - Can you use a mechanical lift or hand truck?
   - Can you lift the load safely, or is it a two- or more person lift? If you doubt you can lift
the load safely, ask for help.

3. Use good lifting techniques.
   - Get close to the load with your feet shoulder-width apart.
   - Get a good handhold, and pull the load close to you.
   - Bend at your knees and hips, keep the inward curve in your back, and lift with your legs.
   - If you need to lean forward, support your upper body weight with one hand.

**Standing Workstations**

Standing for extended periods of time places static load on the back muscles, which can contribute to a back injury. To minimize the risk of developing a injury in the back due to standing, follow these guidelines:

- Keep the torso upright with the natural curve of the spine in a comfortable position.
- Stand on an anti-fatigue mat for cushioning, not on hard floor surfaces. Footrests or foot bars can also be used to change positions.
- Adjust the work to the appropriate height and slope whenever possible. Generally, work should be done at approximately elbow height. The optimum work height for standing or sitting should also take into account the size of the object being worked on and the amount of force being applied. Significant downward forces, for example, are usually best applied when the surface is below elbow height.
- For light-duty tasks, set the work height so that the hands are positioned slightly
(approximately 5 cm [2 inches]) below the elbow.

- For tasks that require lifting or downward forces, the work height should be lower.
- For tasks that have extensive vision requirements, the work height should be increased.

![Diagram](image1)

*Figure 1: Tilted Work Surfaces should be used for drafting or writing*

![Diagram](image2)

*Figure 2: Raised work surfaces should be selected according to the task being performed.*

![Diagram](image3)

*Figure 3: A saddle seat can help for work surfaces between sitting and standing height.*

**The height and position of the work and the worker can help avoid awkward postures:**

- Locate objects within easy arm reach to minimize leaning forward and awkward reaching (e.g., reaching over your head or behind your back).
- Alternate between standing and sitting when possible. Use a sit-lean stand as an alternative to a chair stool.
Hand Tools
A tool that is poorly designed, maintained, or inappropriately used can cause injury. Hand tools should fit the employee's hand; employees with small hands or who are left-handed may need tools designed specifically for these situations. A tool that works well in one situation may expose the user to awkward postures, harmful pressures on the hand, or excessive vibration in another. When selecting and purchasing hand tools, follow these guidelines:

- Select tools that allow the wrist to be held fairly straight and that minimize twisting of the arm and wrist. Good working posture can be maintained when tool features and design are well matched with the task requirements.
- Select tools that allow the operator to use a power grip, not a pinch grip. Pinch grips require excessive force, and can lead to an injury
- Avoid tools that put excessive pressure on any one area of the hand (i.e., sides of fingers, palm of the hand).
- For power or pneumatic tools, select tools with vibration dampening built in whenever possible. Provide personal protective equipment such as anti-vibration gloves to reduce exposure.

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